

AUTOCLAVABLE RECLOSABLE PACKAGE

Cross Reference to Related Application

[0001] The present application is based on and claims priority to U.S. Provisional Patent Application Serial No. 60/430,727, filed on December 3, 2002.

Field of the Invention

[0002] The present invention generally relates to a package having a reclosable zipper member positioned at the mouth of the package to allow the package to be reclosed after initial opening. More specifically, the present invention relates to a zipper closure that hermetically seals the contents of the package and can withstand the temperatures associated with a retort procedure.

Background of the Invention

[0003] Many packaging applications use reclosable containers to store various types of articles and materials. These packages may be used to store and ship food products, non-food consumer goods, medical supplies, waste materials, and various other types of articles. Reclosable packages are convenient in that they can be closed and resealed after the initial opening to preserve the enclosed contents. The need to locate a storage container for the unused portion of the product in the package is thus avoided. As such, providing products in a reclosable package appreciably enhances the marketability of these products.

[0004] Although reclosable packages have been around for quite some time and are used for storing various types of food products, currently available reclosable packages

are not constructed to be used with food products that are subjected to a retort procedure after the food products have been placed into the reclosable package. During the retort procedure, the contents of the package are typically subjected to temperatures of 255°F for a specified period of time to cook the food in its own package, thereby extending shelf life and insuring food safety. Food items such as tuna are often subjected to this type of retort procedure.

[0005] Currently available reclosable packages cannot withstand the temperature requirements of the retort procedure. Specifically, the zipper closure used across the open mouth of the package is typically formed from a polyethylene material that cannot withstand the temperatures required for the retort or autoclave sterilization process.

[0006] Further, packages used during a retort procedure are made from a polypropylene film that can withstand the temperature of the retort procedure. Currently available zipper closures made from polyethylene do not form an adequate bond with the polypropylene film and thus cannot be used for a sealed package.

[0007] Food products that are contained within a reclosable package that are subjected to the retort procedure must be hermetically sealed to prevent contamination. Thus, the zipper closure across the mouth of the package must provide a hermetic seal across the width of the package in order to prevent contamination of the enclosed products before the package is initially opened. Typically, the snap fit between the male and female profile elements of a zipper closure does not provide a hermetic seal.

[0008] During the retort procedure, the contents of the package, such as food particles or liquids, have a tendency to migrate through the mated closure profile and into the package header area of the pouch. When a user tears the pouch header open, the consumer then handles the gripping area above the closure profiles in order to separate the individual members of the zipper closure. Since many products contained within a retort package are messy and possibly greasy, accessing the package interior through the zipper closure becomes more difficult if the product migrates past the closure profile members.

[0009] Therefore, it is an object of the present invention to provide a reclosable package having a zipper closure formed from a material that can withstand the temperatures during the retort procedure. Further, it is an object of the present invention to provide a reclosable package that provides a hermetic seal across the package mouth to prevent contamination of the enclosed products prior to the initial opening of the reclosable package.

[0010] Yet a further object of the present invention is to provide a reclosable package that prevents the migration of the packaged food product past the zipper closure prior to opening of the reclosable package.

Summary of the Invention

[0011] The present invention is a reclosable package that allows the contents of the package to be subjected to a retort procedure while the product is contained within the package. Further, the product package provides a hermetically sealed enclosure that

includes a tamper evident feature such that a user can determine if the package has been previously opened. The product package further prevents the migration of the packaged food product past the zipper closure during the retort procedure and prior to opening of the releasable package.

[0012] The reclosable package is formed from a packaging film that is shaped into a reclosable package using conventional bag forming techniques. However, the packaging film used to create the reclosable package of the present invention is preferably a polypropylene material that can withstand the retort temperatures of 255°F for up to 84 minutes.

[0013] The product package includes mating male and female closure profiles formed on opposite side panels of the product package. The male and female closure profiles mate with each other to allow the product package to be repeatedly opened and reclosed by a user. In the reclosable package of the present invention, both of the male and female closure profiles are formed from a polypropylene material such that the closure profiles can be bonded to the polypropylene side panels. The male and female closure profiles can be bonded to the side panels using either heat alone or heat in combination with a sealant placed between the closure profiles and the side panels. Preferably, the sealant is a polypropylene-based adhesive resin that provides for a strong bond between the closure profiles and the side panels.

[0014] In accordance with a first embodiment of the invention, one of the closure profile members includes a sealing flange that extends from an attachment flange used to

secure the profile to the side panel of the product package. The sealing flange is separated from the attachment flange by a die line or other line of weakness such that the sealing flange can flex relative to the attachment flange. Preferably, the sealing flange includes a layer of sealant on its inner surface.

[0015] During the formation process of the product package, the sealant on the sealing flange is attached to the side panel opposite the side panel to which the closure profile including the sealing flange is attached. In this manner, the sealing flange provides for a hermetic seal along the entire width of the product package. This seal prevents the product from migrating into contact with the zipper closure during the retort procedure.

[0016] The sealant used on the sealing flange is selected such that the sealant forms a bond with the side panel that both provides a hermetic seal and is strong enough to allow the sealing flange to separate from the closure profile along the line of upon initial opening of the product package.

[0017] In an alternate embodiment of the invention, the closure profiles attached to the opposed side panels of the product package are joined to each other by a pair of connector flanges. Thus, the pair of closure profiles and connector flanges are formed as a one piece structure. The connector flanges are separated from each other by a reduced material thickness die line such that the closure profile can be separated along the die line.

[0018] The attachment of the pair of closure profiles along the die line in the alternate embodiment of the invention provides for a hermetic seal beneath the interacting

portions of the closure profile. Thus, the product contained within the product package is hermetically sealed and prevented from migrating past the zipper closure, regardless of the state of interaction between the interlocking members of the closure profile. In the alternate embodiment of the invention, the closure profiles and the side panels of the reclosable package are both formed from a polypropylene material that can withstand the temperatures associated with the retort procedure.

Brief Description of the Drawings

[0019] The drawings illustrate the best mode contemplated of carrying out the present invention. In the drawings:

[0020] Figure 1 is a side view of a flexible, reclosable package having the zipper closure of the first embodiment of the present invention in an open condition prior to product loading;

[0021] Figure 1a is a magnified section view of the zipper closure of Figure 1;

[0022] Figure 2 is a side view illustrating the loading of a product into the reclosable package including the zipper closure of the present invention;

[0023] Figure 3 is a side view illustrating the reclosable package in a sealed condition including a product such that the product can be subjected to the retort procedure;

[0024] Figure 4 illustrates the removal of a header from the product package prior to initial opening;

[0025] Figure 5 is a side view illustrating the separation of the sealing flange from the closure profile along the line of weakness during the initial opening of the product package;

[0026] Figure 6 is a side view of a second embodiment of the zipper closure;

[0027] Figure 6a is a magnified view of the second embodiment of the zipper closure shown in Figure 6;

[0028] Figures 7a-7c are side views of a third embodiment of the zipper closure and illustrate the sealing of the zipper across the package interior and the separation of the sealing flange from the package sidewall during the initial opening of the product package;

[0029] Figures 8a-8c are side views of a fourth embodiment of the zipper closure illustrating the attachment of the sealing flange across the open package interior and the separation of the sealing flange from the package sidewall during the initial opening of the product package.

[0030] Figures 9a-9c are side views of a fifth embodiment of the zipper closure showing the attachment of the sealing flange across the package interior and the separation of the sealing flange from the sidewall during the initial opening of the product package;

[0031] Figures 10a-10d are side views illustrating a sixth embodiment of the zipper closure and further showing the attachment of the sealing flange across the open package

interior and the separation of the sealing flange from the sidewall during the initial opening of the product package;

[0032] Figures 11a-11b are side views of a seventh embodiment of the zipper closure;

[0033] Figures 12a-12c are side views of an eighth embodiment of the zipper closure and illustrate the connection of a pair of sealing flanges and the separation of the sealing flanges during the initial opening of the product package;

[0034] Figures 13a-13c are side views of the ninth embodiment of the zipper closure and illustrate the interconnection between a pair of sealing strips and the separation of the sealing strips during the initial opening of the product package;

[0035] Figures 14a-14c illustrate a tenth embodiment of the zipper closure and illustrate the attachment of the zipper closure to the package sidewalls;

[0036] Figures 15a-15c are side views of an eleventh embodiment of the zipper closure and illustrate the separation of the sealing flange from the closure profile during the initial opening of the product package;

[0037] Figure 16a is a side view of yet another embodiment of a zipper closure that can withstand the retort procedure and provide a hermetically sealed product package;

[0038] Figure 16b is a magnified view of the area illustrated by line 16-16 in Figure 16a;

[0039] Figure 17 is a side view illustrating the bottom filling of the reclosable package including the embodiment of the zipper closure of Figure 16a;

[0040] Figure 18 is a side view illustrating the sealing of the reclosable package prior to the retort procedure;

[0041] Figure 19 is a view illustrating the removal of the package header prior to initial opening the reclosable package;

[0042] Figure 20 is a magnified view illustrating the initial opening of the reclosable package;

[0043] Figure 21 is a side view illustrating the separation of the zipper closure profile elements along a die line to provide access to the product contained within the reclosable package;

[0044] Figure 22 is a side view of an alternate embodiment of a zipper closure for a bottom-fill reclosable package that can withstand the retort process;

[0045] Figure 23 is another embodiment of a zipper closure for a bottom filled reclosable package that can withstand the retort process;

[0046] Figure 24 is another embodiment of a zipper closure for a bottom filled reclosable package that can withstand the retort process;

[0047] Figure 25 is another embodiment of a zipper closure for a bottom filled reclosable package that can withstand the retort process;

[0048] Figure 26 is another embodiment of a zipper closure for a bottom filled reclosable package that can withstand the retort process;

[0049] Figure 27 is another embodiment of a zipper closure for a bottom filled reclosable package that can withstand the retort process; and

[0050] Figure 28 is another embodiment of a zipper closure for a bottom filled reclosable package that can withstand the retort process.

Detailed Description of Preferred Embodiments

[0051] Referring first to Figure 1, there is shown a reclosable package 10 of the present invention. The reclosable package 10 is formed from a first and a second polymeric film side panels 12 and 14 defining an open interior 16. In the embodiment of the invention illustrated, the side panels 12 and 14 are joined to each other by a gusseted bottom wall 18 that allows the open interior 16 of the reclosable package 10 to expand. Although the reclosable package 10 is illustrated in Figure 1 as having the gusseted bottom 18, it should be understood that the reclosable package 10 could be formed without the gusseted bottom while operating within the scope of the present invention.

[0052] As illustrated in Figure 1, the package 10 has an open mouth 20 defined by the top edges 22, 24 of the side panels 12 and 14. The open mouth 20 allows a user access to the open interior 16 of the package 10 and allows for a product to be loaded into the package 10.

[0053] As illustrated in Figure 1, a zipper closure 26 is attached to the package near the open mouth 20 and extends across the entire width of the package between a pair of side edges (not shown). The zipper closure 26 can include a variety of configurations and structures while operating within the present invention, a number of which will be set forth below.

[0054] In the embodiment of the invention illustrated in Figure 1, the zipper closure 26 includes a male closure profile 28 and a mating female closure profile 30. Specifically, the male closure profile 28 includes a male closure post 32 that is received within a groove 34 formed between a pair of female closure posts 36 and 38. The mating interaction between the male closure post 32 and the pair of female closure posts 36, 38 provide for an interlocking seal between the pair of closure profiles 28 and 30. The specific construction and design of the male closure post 32 and the female closure post 36 and 38 is shown for illustrative purposes only and does not limit the scope of the present invention. It should be understood that many various configurations for providing an interaction between the male closure profile 28 and the female closure profile 38 are thought to be within the scope of the present invention.

[0055] Referring now to Figure 1a, in the preferred embodiment of the invention, the male closure profile 28 includes a sealing flange 40 that extends from the attachment flange 42 of the male closure profile 28. The sealing flange 40 is integrally extruded along with the attachment flange 42 and the male closure post 32 and is separated from the attachment flange 42 by a reduced material thickness die line 44. Thus, the sealing flange 40 can pivot relative to the attachment flange 42 about the die line 44. Although the sealing flange 40 is shown attached to the male closure profile 28, it should be understood that the sealing flange 40 could also be formed on the female closure profile 30 while operating within the scope of the present invention. Most importantly, the sealing flange 40 extends from one of the side panels 12 or 14 to the opposing side panel

to provide a hermetic seal below the interaction between the closure profiles as will be made clear below.

[0056] The sealing flange 40 includes a layer of sealant 46 applied to its front surface 48. Preferably, the sealant 46 is applied to the front surface 48 of the sealing flange 40 after the extrusion of the male closure profile 28 and prior to installation of the closure profile 28 to the side panel 12.

[0057] As illustrated in Figure 1a, both the male closure profile 28 and the female closure profile 30 are applied to one of the side panels 12, 14 of the product package. In the embodiment of the invention illustrated, the side panels 12 and 14 are formed from a polymeric material that can withstand the temperatures associated with a retort procedure. Typically, the retort procedure occurs at approximately 255°F for 84 minutes or more. The side panels 12, 14 illustrated in Figure 1a are formed from a polypropylene material such that the side panels 12, 14 can withstand the retort procedure.

[0058] Referring now to Figure 2, there is shown the filling of the reclosable package 10 by a product 50. As illustrated, the product 50 is directed through the open mouth 20 of the reclosable package and is received within the open interior 16. As illustrated in Figure 2, the product 50 flows past the zipper closure 26, including the male closure profile 28 and the female closure profile 30.

[0059] Once a desired amount of product 50 has been placed into the reclosable package 10, the mouth of the package 20 is closed and the side panels 12 and 14 heat sealed to each other along the top seal 52 near the top edge of each panel, as illustrated in

Figure 3. During the sealing of the top edges, the male closure post 32 may or may not be mated with the pair of female closure posts 36 and 38. Thus, after the product has been placed into the reclosable package 10, the top seal 52 close the open interior 16.

However, the package 10 is not hermetically sealed due to the lines of perforation 58 that separate the header 56 from the remainder of the package.

[0060] During creation of the top seal 52, the sealant 46 is pressed into contact with the inner surface 54 of the side panel 14. As illustrated in Figure 3, the sealing flange 40 is thus attached to the side panel 14 opposite the side panel 12 to which the remaining portion of the male closure profile 28 is secured. In the preferred embodiment of the invention, the composition of the sealant 46 is selected such that the sealant 46 can be heat sealed to the inner surface 54 of the side panel 14 during the closure of the open mouth 20. The sealant 46 is selected such that the interaction between the sealant 46 and the inner surface 54 provides a hermetic seal between the sealing flange 40 and the side panel 14.

[0061] In the preferred embodiment of the invention, the side panels 12 and 14 are formed from polypropylene and the sealant 46 is a polypropylene-based adhesive resin. One example of such a sealant is the Admer® QF552A, which is an anhydride modified copolymer polypropylene-based adhesive resin and available from Mitsui Chemical America, Inc. The sealant 46 has a melt flow value in the range of 5.0 to 9.5 g/10min based on the ASTM test method D1238. Further, the sealant 46 preferably has a density in the range of between 0.85 and 0.93 g/cm³ based upon the ASTM test method D1505.

[0062] An important consideration for the sealant 46 in the first embodiment of the invention is that the sealant is able to provide a hermetic seal between the sealing flange 40 and the side panel 14 yet withstand the retort procedure. Typically, the retort procedure occurs at 255°F for the required period of time to cook the food product while it is in the package. The retort procedure may last as long as 84 minutes or more. During the autoclave and sterilization procedures, the sealant must maintain its integrity and remain attached to the side panel 14 to provide a hermetic seal.

[0063] As illustrated in Figure 3, when the sealing flange 40 is attached to the side panel 14, the product 50 within the open enclosure can be subjected to the retort procedure. During this procedure, the product 50 is cooked in the package and harmful bacteria or other contaminants are killed. This type of retort procedure is typically associated with fresh food products, such as tuna or other perishable items.

[0064] In accordance with the present invention, the closure profiles 28 and 30 are formed from a specified material such that the profiles 28 and 30 can withstand the retort procedure and bond to the polypropylene side panels 12 and 14. In prior art available reclosable packages, the closure profiles are formed from a polyethylene material having properties that cannot withstand the autoclave procedure and do not bond well to the polypropylene side panels 12 and 14.

[0065] In the present invention including the alternate embodiments to be described below, the male and female closure profiles 28 and 30 are formed from a random copolymer polypropylene that can withstand the retort process. Specifically, the

reclosable profiles 28 and 30 are formed from a material having a melt index in the range between 1.7 and 3.5 g/10min as measured using the ASTM test method D1238. Further, the polypropylene material used to form the closure profiles 28 and 30 has a density in the range between 0.895 to 0.910 g/cm³ as measured by the ASTM test method D1505. An example of such a product is the Atofina® copolymer product number 6289MZ.

However, other types of polymer materials are contemplated as being within the scope of the present invention.

[0066] As can be understood by the above description, it is important that the material selected for the male closure profile 28 and the female closure profile 30 be able to withstand temperatures of approximately 255°F for up to an 84 minute period.

[0067] In the embodiment of the invention illustrated in Figure 3, the male and female closure profiles 28 and 30 can be attached to the side panels 12 and 14 either solely through the application of heat or through the combination of heat and a sealant layer between the closure profiles 28, 30 and the side panels 12, 14. If a sealant layer is used, the sealant is typically the same as the sealant 46 applied to the sealing flange 40. Thus, a hermetic seal is also created between each of the closure profiles 28, 30 and the side panels 12, 14, as well as along the line of sealant 46.

[0068] Once the product 50 has been subjected to the retort procedure when it is contained within the reclosable package 10, the reclosable package 10 including the products 50 can be shipped to consumers. Upon receipt, the consumer can open the reclosable package by grasping the top tear off header 56, as illustrated in Figure 4.

Referring back to Figure 3, the top tear off header 56 is separated from the remaining portions of the side panels 12 and 14 by lines of perforation 58 contained in each of the side panels 12 and 14. Once the top tear off header 56 has been separated, the user can access the pair of closure profiles 28 and 30.

[0069] As can be understood by the above description, the seal between the sealing flange 40 and the side panel 14 prevents the food product 50 from migrating through the zipper closure and into contact with the gripping ridges 60 formed on the pair of closure profiles 28 and 30, as illustrated in Fig. 4. Since the food product contained within the package may be greasy or messy, the prevention of the migration of the food product past the zipper closure allows the user to more easily grasp the gripping ridges 60 to open the package.

[0070] Referring now to Figure 5, once the user has grasped the gripping ridges 60, the male and female closure profiles 28 and 30 can be pulled apart to open the mouth 20 as illustrated. As the mouth 20 is opened, the sealing flange 40 separates from the attachment flange 42 along the die line 44 and remains attached to the side panel 14, as illustrated in Figure 5. In the embodiment of the invention illustrated, the sealant 46 forms a sufficiently strong bond with the side panel 14 such that the sealing flange 40 separates from the attachment flange 42 before the sealing flange 40 is released from the side panel 14. Thus, in addition to providing a seal to prevent product migration past the zipper closure, the combination of the sealing flange 40 and the sealant 46 acts as a tamper evident feature for the opening of the product package 10.

[0071] After the sealing flange 40 has been separated, the product 50 can be removed through the open mouth 20 and the package 10 resealed by re-engaging the male closure profile 28 and the female closure profile 30.

[0072] Referring now to Figure 6, there is shown an alternate embodiment of the male closure profile 28. In the second embodiment, the sealing flange 62 has a semi-circular configuration and includes a pair of die lines 64 and 66. The sealing flange 62 is attached to the attachment flange 42 and separates from the attachment flange 42 when the product package 10 is opened for the first time.

[0073] As can be seen in Figure 6a, the sealant 46 is applied to the outer end 68 of the sealing flange 66 and contacts the side panel 14 to form a hermetic seal between the sealing flange 62 and the side panel 14. In the embodiment of the invention illustrated in Figure 6, the sealant 46 and the closure profiles 28 and 30 are formed from the same material illustrated and described in Figures 1-5.

[0074] Referring now to Figures 7a-7b there is shown another alternate embodiment for the zipper closure to be used across the open mouth 20 of a product package that can be subjected to the retort process. The zipper closure includes a male closure profile 28 and a female closure profile 30 that are designed to mate and engage to hold the open mouth 20 closed. In the embodiment of the invention illustrated, the male closure profile includes a depending sealing flange 86. The sealing flange 86 includes a layer of releasable sealant 88 on its first face surface 90 and a layer of permanent sealant 92 on the opposite, second face surface 94. In the embodiment of the invention

illustrated, the permanent sealant 92 has the same composition as the sealant 46 included on the sealing flange 40 shown in Figure 5.

[0075] When the reclosable package 10 is in the closed position shown in Figure 7b, the permanent sealant 92 is in contact with the side panel 14 while the releasable sealant 88 contacts the side panel 12. In this position, the sealing flange 86 prevents product from seeping past the closures and contacting the gripping ridges 60. When the reclosable package 10 is opened for the first time, as illustrated in Figure 7c, the sealing flange 86 separates from the side panel 12 along the releasable sealant 88. Thus, the releasable sealant 88 forms a "peel seal" between the sealing flange 86 and the side panel 12. In the preferred embodiment of the invention, the releasable sealant 88 is an FDA approved sealant.

[0076] Referring now to Figures 8a-8c, there is shown yet another embodiment of the zipper closure positioned along the mouth 20 of the reclosable package 10. In the embodiment of the invention illustrated, the male closure profile 28 includes a sealing flange 96. The sealing flange 96 is formed integrally with the remaining portions of the male closure profile 28 and includes a releasable sealant 98 applied to the front face 100 of the sealing flange 96. As illustrated in Figure 8b, the releasable sealant 98 creates a seal between the sealing flange 96 and the side panel 12 to prevent the product from seeping between the closure profiles prior to opening. When the package 10 is opened for the first time, as shown in Figure 8c, the releasable sealant 98 separates from the side panel 12 and allows for access to the contents of the package. As discussed above in the

embodiment shown in Figures 7a-7c, the releasable sealant 98 is preferably an FDA approved sealant for contact with food products.

[0077] Referring now to Figures 9a-9c, there is shown yet another embodiment of a method for creating the reclosable package 10. In the embodiment of the invention illustrated, the zipper closure 26 is initially installed in a mated condition. Specifically, the male closure profile 28 and the female closure profile 30 are installed in the mated condition shown in Figure 9a. As shown, the female closure profile 30 is initially attached to the side panel 12 through the application of heat or an adhesive while the male closure profile 28 is spaced from the side panel 14. When the zipper closure 26 is in the position shown in Figure 9a, product can be fed into the package interior 16 through the opening 95 that exists between the side panel 14 and the male closure profile 28.

[0078] Once the package has been filled, the male closure profile 28 is attached to the side panel 14 through the application of heat or an adhesive. At the same time, the sealing flange 96, including the releasable sealant 98, is secured to the opposite side panel 12. As can be understood in Figures 9a and 9b, the method of the invention allows the product to be filled past the zipper, rather than through the zipper as in the previously described embodiment of Figures 8a-8c.

[0079] When the reclosable package 10 is opened for the first time, the sealing flange 96 separates from the side panel 12 along the layer of releasable sealant 98.

[0080] Referring now to Figures 10a-10c, there is shown yet another embodiment of the invention similar to the embodiment shown in Figures 9a-9c. As described above,

the zipper closure 26 is initially installed in a mated condition and product is fed into the open interior 16 through the opening 95 between the side panel 14 and the male closure profile 28. However, in the embodiment shown in Figure 10a, the sealing flange 96 is separated from the remaining portions of the male closure profile 28 by a line of weakness 100. Additionally, the sealing flange 96 includes a permanent sealant 102 that creates a bond with the side panel 12, as shown in Figure 10b.

[0081] When the reclosable package 10 is opened for the first time, the sealing flange 96 separates from the remaining portions of the male closure profile 28 along the line of weakness 100 to provide access to the open interior 16. The permanent sealant 102 is sufficiently strong to cause the separation of the sealing flange 96 from the male closure profile 28 upon initial opening. In the embodiment shown in Figures 10a-10c, the permanent sealant 102 is the same composition as the sealant 46 shown in the first embodiment of Figure 1a.

[0082] Referring now to Figures 11a-11b, there is shown yet another embodiment of a zipper closure 104. In the embodiment of the invention shown in Figure 11a, the zipper closure 104 includes a male profile element 106 and a female profile element 108. The male profile element 106 includes an attachment flange 110 while the female profile element includes a similar attachment flange 112. As illustrated, the attachment flanges 110, 112 are joined to each other along an apex 114. In the preferred embodiment of the invention, the apex 114 includes a line of weakness such that the attachment flange 110 can separate from the attachment flange 112 along the apex 114.

[0083] As illustrated in Figure 11a, the male profile element 106 is initially attached to the side panel 12 by the application of heat or an adhesive while the female closure profile 108 is spaced from the side panel 14 by the opening 95. In this mated, spaced condition, product can be inserted into the open interior 16 of the reclosable package 10 through opening 95 and past the zipper closure 104. Once the product has been inserted, the female profile element 108 is attached to the side panel 14 by the application of heat or an adhesive to provide a seal across the mouth of the package. In the preferred embodiment of the invention, the male and female profile elements 106, 108 are extruded as one piece and are joined to each other along the apex 114. During initial product opening, the male and female profile elements 106, 108 separate from each other along the apex 114 to provide access to the open bag interior.

[0084] Figures 12a-12c illustrate yet another embodiment of a zipper closure 26 positioned at the open mouth of the reclosable package 10. In the embodiment illustrated in Figure 12a, the male closure profile 28 includes an attachment flange 116 while the female closure profile 30 includes a similar attachment flange 118. The attachment flanges 116 and 118 are not adhered to the side panels 12, 14 and each include a releasable sealant 120.

[0085] As illustrated in Figure 12b, when the package 10 is closed, the releasable sealants 120 engage each other to provide a hermetic seal across the entire width of the package 10. In the preferred embodiment of the invention, the releasable sealant 120 is an FDA approved releasable sealant.

[0086] As shown in Figure 12c, when the package 10 is opened for the first time, the releasable sealant 120 formed on each of the attachment flanges 118 and 116 separate to provide access to the open interior of the product package 10.

[0087] Figures 13a-13c illustrate yet another embodiment of the present invention for the creation of a reclosable package 10 that can withstand the retort process. As illustrated, the side panel 12 includes a first sealant strip 122 while the second side panel 14 includes a second sealant strip 124. The sealant strips 122 and 124 are aligned with each other such that when the reclosable package 10 has been filled, the sealant strips 122 and 124 are brought into a mating relationship, as shown in Figure 13b. The interaction between the sealant strips 122 and 124 provide a continuous seal across the interior of the reclosable package 10 and prevents product from migrating past the sealant strips into contact with the zipper closure 26.

[0088] As shown in Figure 13c, when the package 10 is opened for the first time, the sealant strips 122 and 124 separate from each other to provide access to the open interior 16 of the package 10. In the preferred embodiment of the invention, the sealant strips 122 and 124 create a peel seal and are formed from the same releasable sealant as described above.

[0089] Figures 14a-14c show alternate methods for attaching yet another zipper closure across the open mouth of a reclosable package 10. As illustrated in Figure 14a, the zipper closure includes a male closure profile 28 and a female closure profile 30. The male closure profile 28 includes a sealing flange 126. The sealing flange 126 includes a

heat resistant layer 128 formed on the back surface 130. A releasable sealant 132 is formed on the opposite surface 133 of the sealing flange 126. The zipper closure shown in Figure 14 is configured to allow product to be filled through the zipper and into the open interior of the package.

[0090] Figure 14b illustrates the same zipper closure as shown in Figure 14a except installed in an alternate manner. As illustrated in Figure 14b, the male and female closure profiles 28, 30 are initially engaged with each other and the female closure profile attached to the side panel 12 through the application of either heat or the use of an adhesive. In this condition, product can be inserted into the open interior 16 of the package through the opening 95 between the back face surface 135 of the male profile element 28 and the side panel 14. As illustrated, the back surface 135 of the male closure profile 28 includes lines of adhesive 134. The lines of adhesive 134 bond with the side panel 14 through the application of heat to adhere the zipper closure across the open mount of the reclosable package.

[0091] As illustrated in Figure 14c, the releasable sealant 132 attaches to the side panel 12 while the layer of heat resistant material 130 prevents attachment of the sealing flange 126 to the side panel 14.

[0092] Upon opening the reclosable package 10 for the first time, the sealing flange 126 separates from the side panel 12 along the releasable sealant 132. Alternatively, the sealing flange 126 can include a line of weakness such that the sealing

flange 126 separates from the remaining portion of the male closure profile 28 during the initial opening.

[0093] Figures 15a-15c illustrate yet another embodiment of the zipper closure 26. In the embodiment shown in Figure 15a, the male closure profile 28 includes a depending sealing flange 136. The sealing flange 136 is separated from remaining portions of the male closure profile 28 by a line of weakness 138, as shown in Figure 15b. Referring back to Figure 15a, the sealing flange 136 includes multiple ribs 140 formed from a permanent sealant. The ribs 140 form a bond with the side panel 12 when the package 10 is closed, as shown in Figure 15b.

[0094] Referring back to Figure 15a, the opposite face surface of the sealing flange includes a series of ribs 142 formed from a non-sealing material. The ribs 142 prevent the sealing flange 136 from becoming attached to the side panel 14 when the reclosable package 10 is closed, as shown in Figure 15b.

[0095] When the package 10 is initially opened, the sealing flange 136 separates from the remaining portions of the male closure profile 28 along the line of weakness 138. Thus, when the package is initially opened, the sealing flange 136 remains attached to the side panel 12 as illustrated in Figure 15c.

[0096] As can be understood by the description of the alternate embodiments shown in Figures 1-15, the zipper closure positioned along the open mouth of the reclosable package allows the opposite side panels to be mated together to close the package. Each of the alternate embodiments illustrated includes a sealing flange or

similar element that extends across the open interior of the reclosable package to prevent product from migrating into contact with the closure elements of the mating male and female closure profiles 28, 30. In each embodiment of the invention, the male and female closure profiles are formed from a polypropylene material that is bonded to the polypropylene side panels 12 and 14. The materials used to form the zipper closure and side panels can withstand the temperatures associated with the retort process, as clearly described above. The embodiments illustrated in Figures 1-15 allow for top filling of the package either through the closure profiles or past the closure profiles, as described. Once the product package is filled, the top edge of the package is sealed to create a package that can withstand the retort process.

[0097] Referring now to Figure 16a, there is shown another alternate embodiment of the zipper closure, as referred to by reference numeral 70. The zipper closure 70 includes a male closure profile 72 and a female closure profile 74. The male and female closure profiles 72 and 74 each include an attachment flange 76 that is joined to the respective side panel 12, 14 of the reclosable package in the manner previously described.

[0098] Referring now to Figure 16b, both of the male and female closure profiles 72 and 74 are joined to each other by connecting flanges 78 and 80. The connecting flanges 78 and 80 are joined to each other along a line of weakness, such as a folded die line 82 that defines a weakened portion of the zipper closure 70.

[0099] As illustrated in Figure 16a, the reclosable package has an open bottom end 84 through which product can be bottom filled into the reclosable package 10. The

interconnection of the connector flanges 78 and 80, as well as the attachment of the male and female closure profiles 72, 74 to the side panels 12 and 14, provides a hermetic seal at the top of the package 10 below the male and female closure posts.

[0100] Referring now to Figure 17, product 50 can be inserted into the package 10 through the open bottom end 84. After the product 50 has been inserted into the package, the side panels 12 and 14 are heat sealed to each other along a sealing joint 86 (Figure 18) to define the package. Once the bottom end 84 has been sealed along the joint 86, the package is subjected to the retort procedure, inverted and shipped to a consumer.

[0101] Upon receipt, the consumer can grasp the top tear off header 88 which is separated from the side panels 12 and 14 along a pair of lines of perforation 90 and 92 shown in Fig. 18. Upon grasping the top tear off header 88, the user can remove the top tear off header 88 as illustrated in Figure 19.

[0102] Once the top tear off header 88 has been removed, the user can grasp the gripping strips 60 formed on the male closure profile 72 and the female closure profile 74 and pull the profiles 72, 74 apart until the male closure post 32 separates from the pair of female closure posts 36 and 38, as illustrated in Figure 20. As illustrated in Figure 20, the die line 82 between the connecting flanges 78 and 80 provides a seal upon the initial separation of the interlocking profiles.

[0103] As with the first embodiment of the invention previously described, the connection between the flanges 78 and 80 prior to product being inserted into the package and subjected to the retort procedure prevents the product from migrating through the

interlocking members of the zipper closure. Thus, upon initial opening of the package, the user can grasp the male closure profile 72 and the female closure profile 74 without any product being present.

[0104] As illustrated in Figure 21, if the user further pulls the male and female closure profiles 72 and 74 apart, the connecting flanges 78 and 80 separate to provide access to the product 50 contained within the reclosable package. In this manner, the male and female closure profiles 72, 74 provide not only a seal to prevent product migration past the zipper closure, but also provide a tamper evident feature to the reclosable package.

[0105] Figure 22 illustrates an alternate embodiment of the zipper closure 70 for a bottom filled package. In the embodiment shown in Figure 22, the male closure profile 72 and the female closure profile 74 are joined to each other by a membrane 144. The membrane 144 includes a first end 146 coupled to the male closure profile 72 and a second end 148 coupled to the female closure profile 74. In the preferred embodiment of the invention, the membrane 144 has a material strength less than the strength of the bond between the male and female closure profiles 72, 74 and the side panels 12, 14. Thus, during the initial opening of the reclosable package 10, the membrane 144 tears or ruptures to provide access to the open interior of the reclosable package 10.

[0106] In one contemplated embodiment of the invention, the first and second ends 146, 148 of the membrane 144 are adhesively attached to the male and female closure profiles 72, 74. However, it is contemplated that the membrane 144 could be co-extruded

with the male and female closure profile elements 72 and 74. In either case, the bond between the first and second ends 146, 148 of the membrane 144 to the male and female closure profiles 72, 74 must be greater than the material strength of the membrane 144 such that the membrane 144 tears upon initial opening of the product package. Additionally, the membrane 144 must be selected such that it is impermeable to the product contained within the reclosable package 10 to prevent the product from migrating into contact with the closure elements of the zipper closure.

[0107] Figure 23 illustrates yet another embodiment of the zipper closure 70 particularly useful with a bottom-fill reclosable package 10. In the embodiment shown in Figure 23, the male and female closure profiles 72, 74 each include a depending attachment flange 150, 152. The attachment flanges each include a releasable sealant 154, 156 such that the attachment flanges 150, 152 can be joined to each other along the releasable sealants 154, 156. During initial opening of the product package, the attachment flanges 150, 152 separate from each other through the separation of the releasable sealant layers 154, 156. Preferably, the releasable sealant 154, 156 is an FDA approved sealant.

[0108] Figure 24 illustrates yet another alternate embodiment of the zipper closure 70 for use with a bottom-fill reclosable package. In the embodiment illustrated in Figure 24, the male closure profile 72 includes an extended sealing flange 154 that extends across the open interior of the package from the side panel 12 to the side panel 14. The

sealing flange 154 includes a releasable adhesive 156 that holds the sealing flange 154 in contact with the side panel 14.

[0109] During initial opening of the package, the sealing flange 154 separates from the side panel 14 along the releasable adhesive 156. In the preferred embodiment of the invention, the releasable adhesive 156 is an FDA approved sealant.

[0110] Figure 25 illustrates another alternate embodiment for the zipper closure 70 for use with a bottom-fill reclosable package. As illustrated in Figure 25, a membrane 158 extends across the open package interior from the male closure profile 72 to the side panel 14. The male closure profile 72 includes an extended attachment flange 160. The extended attachment flange 160 receives a first end 162 of the membrane 158. Preferably, the membrane 158 can be attached to the extended attachment flange 160 through either a layer of adhesive or through a co-extrusion process. The second end 164 of the membrane 158 includes a releasable sealant 166 that allows the membrane 158 to be removably attached to the side panel 14.

[0111] During initial opening of the package 10 shown in Figure 25, the bond between the releasable adhesive 166 and the side panel 14 is destroyed to provide access to the open interior of the package. As can be understood, the bond between the first end 162 of the membrane 158 and the attachment flange 160 is greater than the strength of the sealant 166 such that the opening interior of the product package can be accessed.

[0112] Figure 26 illustrates yet another embodiment of the invention. The embodiment illustrated in Figure 26 is similar to the embodiment illustrated in Figure 24

and includes a sealing flange 154 that extends from the male closure profile 72.

However, in the embodiment illustrated in Figure 26, the sealing flange 154 includes a line of weakness 168. Additionally, the end 170 of the sealing flange 154 is attached to the side panel 14 by a permanent sealant 172, rather than the releasable sealant 156 shown in Figure 24.

[0113] During initial opening of the product package 10, including the zipper closure 70 shown in Figure 26, the sealing flange 154 fractures along the line of weakness 168. The separation along the line of weakness 168 allows for access to the open interior of the product package 10 including the zipper closure 70 shown in Figure 26. The permanent sealant 172 shown in Figure 26 is preferably the same sealant shown and described in the first embodiment of the invention shown in Figure 1a.

[0114] Figure 27 illustrates yet another embodiment of the zipper closure 70 for use with a bottom-fill reclosable package 10. In the embodiment of the invention illustrated, the male closure profile and the female closure profile 74 are joined to each other along a curved, center section 174. The center section 174 includes a line of weakness 176 positioned somewhere along its length. The line of weakness 176 can be formed either during the extrusion process, or as a weakened area during subsequent processing of the zipper closure 70. When the reclosable package 10 is initially opened, the male closure profile 72 separates from the female closure profile along the line of weakness 176.

[0115] Referring now to Figure 28, there is shown yet another embodiment of the zipper closure 70 of the present invention for a bottom-fill reclosable package. In the embodiment shown in Figure 28, a first sealant strip is formed on the side panel 12 and a second sealant strip 180 is formed on the opposite side panel 14. Prior to filling of the package 10, the sealant strips 178 and 180 are brought into contact with each other, as shown. The interaction between the sealant strips 178 and 180 prevents product from migrating into contact with the closure elements formed on the male closure profile 72 and the female closure profile 74.

[0116] Once the product has been filled into the reclosable package and subjected to the retort process, the package can be stored. Upon initial opening, the male and female closure profile elements 72, 74 are separated. Further separation results in the separation of the sealant strips 178, 180 to provide access to the open interior 16 of the package 10. In the preferred embodiment of the invention, the sealant strips 178, 180 are formed from a releasable sealant.

[0117] In the embodiments of the invention illustrated in Figures 16-28, the male and female closure profiles 72 and 74 are formed from the same material as the closure profiles described above in reference to the top filled package and zipper designs shown in Figures 1-15. Thus, the bottom filled reclosable packages illustrated in Figures 16-28 can be subjected to the retort procedure without negatively affecting the performance of the male and female closure profiles.

[0118] Having described the presently preferred embodiments, it is to be understood that the invention may be otherwise embodied within the scope of the appended claims.